



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/787,037	02/24/2004	Akira Sugiyama	60896 (70551)	3898

21874 7590 12/21/2006  
EDWARDS & ANGELL, LLP  
P.O. BOX 55874  
BOSTON, MA 02205

EXAMINER
----------

MOORE, KARLA A

ART UNIT	PAPER NUMBER
----------	--------------

1763

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/21/2006	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/787,037

Applicant(s)

SUGIYAMA, AKIRA

Examiner

Karla Moore

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-6 and 8-12 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Objections*

1. Claim 3 is objected to because of the following informalities: it depends upon a cancelled claim. For examination purposes, Examiner has assumed that the claims was meant to depend from claim 1. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3-6 and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Publication No. 2005/0279458 A1 to Okumura et al. in view of U.S. Patent No. 5,549,780 to Koinuma et al. and Japanese Patent Publication No. 2002-151494A to Yara et al.
4. Okumura et al. disclose a plasma processing apparatus generating plasma under atmospheric pressure for processing an object substantially as claimed in Figures 1-2 and 22, the apparatus comprising: first (13) and second electrodes (14) adjacent to each other and facing a surface of the object (11) to be processed; a dielectric (1 and 2) having a first opposing surface (1) positioned spaced apart from the surface of the object and a second opposing surface (2) positioned spaced apart from the surface of the object, filled between said first and second electrodes; gas supplying means (Figure 22; paragraphs 149 and 157) provided inside said first electrode having a supply opening formed in said first opposing surface for supplying the process gas to the surface of the object through said supply opening; and gas exhausting means (see paragraphs 149 and 157) provided inside said second electrode having an exhaust opening formed in said second opposing surface for exhausting the processing gas supplied to the surface of the object through said exhaust opening.

Art Unit: 1763

5. Although, Okumura et al. do not explicitly teach a gas exhaust mechanism in the second electrode, it is taught that gas flow mechanisms can be provided in the second electrode, as provided in the first electrode and that it is acceptable to reverse the flow mechanism of the supply and exhaust mechanisms. Thus, one of the flow mechanisms provided in first and second electrodes can be provided as a gas supply mechanism and the other can be provided as a gas exhaust mechanism.

6. Okumura et al. fail to teach the electrodes have coated surfaces.

7. Koinuma et al. disclose coating the surfaces of electrodes for the purpose of protecting the electrode from the processing gases (column 7, rows 25-33)

8. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided coated electrodes in Okumura et al. in order to protect the electrodes from processing gases as taught by Koinuma et al.

9. Okumura et al. and Koinuma et al. disclose the invention substantially as claimed and as described above.

10. However, Okumura et al. and Koinuma et al. further fail to teach that the first opposing surface of the dielectric is provided spaced apart from the surface of the object *and between the object and the first electrode* and that the second opposing surface is provided spaced apart from the surface of the object *and between the object and the second electrode*.

11. Yara et al. teach providing a dielectric comprising a first opposing surface provided spaced apart from the surface of an object to be processed and between the object and a first electrode and a second opposing surface provided spaced apart from the surface of the object and between the object and a second electrode for the purpose of providing an atmospheric plasma apparatus capable of more efficient, accelerated downstream processing, improved yield and prevention of rate fall of large area substrate processing (abstract, paragraphs 43-44 and 76; Figure 3).

12. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a dielectric comprising a first opposing surface provided spaced apart from the surface of the object to be processed and between the object and a first electrode and a second opposing surface provided spaced apart from the surface of the object and between the object and a

Art Unit: 1763

second electrode in Okumura et al. and Koinuma et al. in order to provide an atmospheric plasma apparatus capable of more efficient, accelerated downstream processing, improved yield and prevention of rate fall of large area substrate processing as taught by Yara et al.

13. With respect to claim 3, in Okumura et al. each of the dielectric plates has an "inner wall" which is dielectric and faces the electrode and therefore around said gas supplying and gas exhausting means (see Figure 1-2 and 22).

14. With respect to claim 4, the coated surfaces of said first and second electrodes as described above, respectively, extend on a plane parallel to the surface of the object

15. With respect to claim 5, in Okumura et al., an electric line of force connecting said first and second electrodes when a voltage is applied between said first and second electrode extends above and substantially parallel to the surface of the object.

16. With respect to claim 6, as described above, said supply opening and exhaust opening are provided in a vicinity of a region positioned between said first opposing surface and said second opposing surface.

17. With respect to claim 8, with respect to claim 8, said supply opening and said exhaust opening are formed to have *a slit shape extending in one direction* or formed as a plurality of pores arranged in one direction (paragraph 149).

18. With respect to claim 9, Okumura et al. teach that it is ideal to design the gas supplying means and said gas exhausting means so that gas supplied through the gas supplying means is exhausted through the gas exhausting means in order to make it possible to prevent plasma processing from being carried out in a wide range portion beyond the area where plasma processing is desired (paragraph 158).

The courts have ruled that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

19. With respect to claim 10, although specific relationships between the sizes of the electrodes and distances between the electrodes and the object are not explicitly taught, each of the relied upon references clearly teaches that processing characteristics can be customized by tailoring the electrode configuration (e.g. Yara et al. at paragraphs 71 of online JPO translation):

Art Unit: 1763

20. With respect to claim 11, Koinuma et al. teach providing a grounded conductive cover (23 and 28) is provided to cover externally exposed surfaces of said first and second electrodes. They are provided for the purpose of serving as the body of the apparatus (see column 5, rows 46-61).

21. Claims 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al., Koinuma et al. and Yara et al. as applied to claims 1, 3-6 and 8-11 above, and further in view of Japanese Patent No. 2001103199 A to Nakamura et al.

22. Okumura et al., Koinuma et al. and Yara et al. disclose the invention substantially as claimed and as described above.

23. However, Okumura et al., Koinuma et al. and Yara et al. and Kubota et al. fail to teach a third electrode positioned next to said second electrode on a side opposite to said first electrode with respect to said second electrode, said apparatus being formed in symmetry with respect to said second electrode.

24. Nakamura et al. teach providing a third electrode in a dielectric discharge apparatus so that a lengthened plasma space is provided and a substrate can be processed while being conveyed through the space (Figure 11, paragraphs 65-69 of JPO online translation).

25. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a third electrode in Okumura et al., Koinuma et al. and Yara et al. in order to provide a lengthened plasma space for a conveyed substrate as taught by Nakamura et al.

***Allowable Subject Matter***

26. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

27. The prior art of record fails to teach or fairly suggest said dielectric includes a recessed portion formed such that distance from the surface of the object to said second opposing surface is made larger than distance from the surface of the object to said first opposing surface. Further, no other piece of prior art fairly teaches this recitation along with the requisite motivation for combination with the relied upon prior art.

Art Unit: 1763

**Response to Arguments**

28. Applicant's arguments with respect to claims 1,3-6 and 8-12 have been considered but are moot in view of the new ground(s) of rejection. Okumura et al. teach provision of gas supplying means and gas exhaustion means inside a first and second electrode, respectively.

**Conclusion**

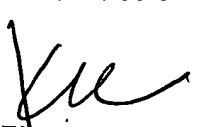
29. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. JP 2002151543 A discloses a atmospheric plasma processing apparatus with dielectric surrounded electrodes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 571.272.1440. The examiner can normally be reached on Monday-Friday, 9:00 am-6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571.272.1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-

1000.

  
**KARLA MOORE**  
**PRIMARY EXAMINER**

Art Unit 1763

17 December 2006